

## Chapter 8 Closed-Circuit Television (CCTV)

CCTV cameras are to be located at intervals of approximately one mile on the freeway. It is not unusual to have more than one camera per mile. The proper position of cameras and provision for the required conduit and foundations will be accomplished at the time the FMS is designed. 100 percent coverage of the mainline and TI crossroads is desired.

Camera locations will be at one of two locations within a typical mile. The first and preferred location is placing the CCTV cameras in the close vicinity of the interchange. In this position, visibility of the arterial roadway (especially regionally significant roadways), key ramps, and the mainline freeway can be accomplished. The second potential location is at the midpoint location between interchanges. This midpoint location is desirable to observe the mainline where the interchange CCTV view is blocked by the arterial overcrossing or in cases where roadway geometrics dictate additional cameras.

**Note:** See Figures 2.1, 4.1, and 4.2 for typical CCTV locations.

Other CCTV camera placement criteria include:

- Near the point of intersection (PI) of horizontal curves that restrict visibility to less than one mile;
- At locations with recurring congestion and other high interest areas;
- On the crests of vertical curves;
- Positioned to view adjacent freeway DMS for message verification; and
- Complex sites where more than one CCTV may be necessary.

If a bucket truck survey is required because of questionable visibility for a CCTV camera location, include the following steps and considerations:

1. Order traffic control;
2. Identify potential power sources;
3. Stagger CCTV cameras left and right of freeway centerline;
4. Anticipate view blockage: high mast poles, signs, sound walls, and future obstructions, such as new overcrossing or pedestrian structures; and
5. Prepare a color map with one-mile overlapping 20° cones of view emanating from each camera position. View cones must overlap.

The bucket truck survey should simulate the exact position of the camera, capturing photos, and video that can be scrutinized as representing the viewpoint of the camera. Each camera site should be approved by the ADOT TTG PM upon review of the bucket truck survey. Rejected camera locations may require additional bucket truck surveys to be conducted to refine the selection of the optimum site.

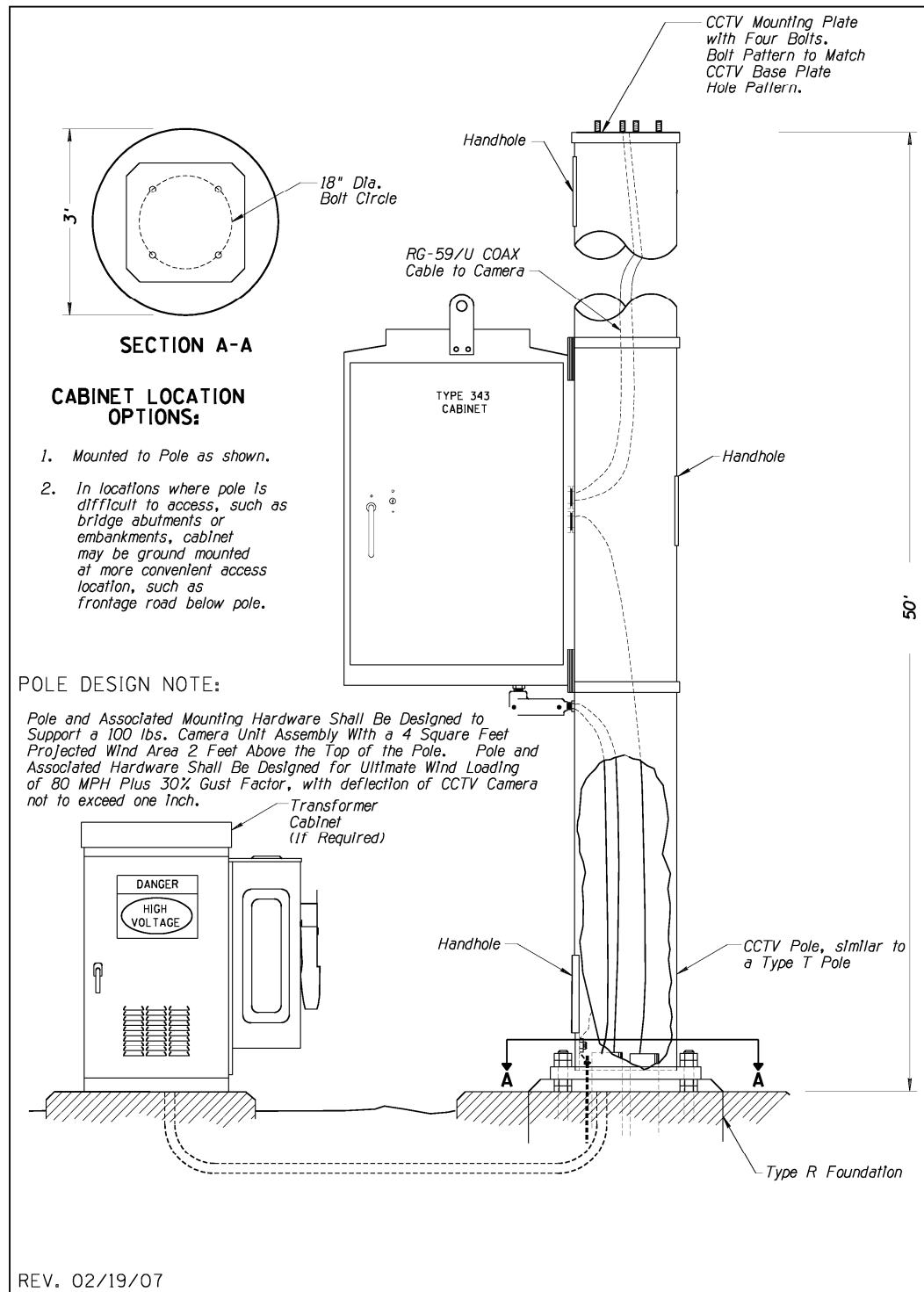
The CCTV pole should be located so that a maintenance vehicle (bucket truck with outriggers) can park in the immediate vicinity without necessitating a lane closure or blocking traffic. Where crossroads go over the freeway, the area near the bridge abutment is typically a level accessible area well suited for a CCTV pole. A maintenance vehicle can often be positioned partially on the sidewalk if the area behind

the walk is clear of landscaping. The designer should coordinate each proposed CCTV location with the ADOT TTG PM. The designer should also meet with ADOT ITS maintenance staff to determine, and consequently stake, the appropriate CCTV camera foundation location prior to construction. It will be the designer's responsibility to coordinate with the ADOT TTG and ITS maintenance staff.

The specifications should call out any necessary vendor support required to validate camera warranties, such as inspection of installation by the camera vendor.

As CCTV and modem technology has improved, more of the functionality resides in the camera unit itself, allowing cabinets to shrink considerably. Smaller CCTV cabinets (Type 343) may be mounted on the pole supporting the camera or ground mounted at a convenient location with easier access, such as adjacent to a frontage road below a pole placed on a mainline embankment. Foundations for CCTV cabinets that are not mounted on the pole should be located using the same criteria as "Equipment Cabinet Location" in Chapter 6.

The designer should coordinate with ADOT TTG to determine the type (barrel, dome) and mount (top, pendant) of the state-furnished camera planned for each particular location. ADOT currently uses the barrel type camera for all installations due to maintenance cleaning problems associated with dome cameras placed outdoors. Cameras are typically mounted on an ultra-stable *Modified Type T* pole (see ADOT *Standard Drawing TS 4.14*). The pole shall be engineered by the contractor to resist vibration and allow no more than one inch of deflection in an 80 mph wind with 30% gust factor at the top of the pole. The camera mount should be secure and consistent with the high standards for the pole. Once the design has been approved, the CCTV pole location should be marked in the field and approved by the engineer prior to construction. Figure 8.1 depicts a typical CCTV pole and cabinet configuration.



**Figure 8.1 Closed Circuit Television Typical Pole and Cabinet**

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